Kansas Department of Transportation

Abandoned Underground Coal Mines under New Alignment
US–54 Fort Scott, Kansas

Richard Ryan, Regional Geologist, Kansas Department of Transportation, Chanute, KS

The Kansas Department of Transportation (KDOT) continually encounters hazards in Southeast Kansas caused by abandoned underground coal mines. Federal Aid Project NHS K575 (801) or KDOT Project 54-6 K-5758-01, US-54 from the east city limits of Fort Scott to the Kansas/Missouri State Line, was no exception. What was originally perceived to be minor surface work of excavating and re-compacting some small narrow strip pits, trenches and spoil piles turned out to be a major project.

This project consists of 3.7 miles (6 km) of east-west roadway offsetting US-54 1/3 mile to the north on new alignment and includes 2 bridges.

During the initial Geology Investigation that took place 4 years ago, we were aware of some small coal mine shafts found in a creek bank near the existing highway. No maps of coal mining were available in this area. Local people would point out shafts or pits outside of the proposed right-of-way and stated that mining occurred before the 1930's by small "one mule operations" that didn't amount to much. Drilling encountered a thin 2-foot coal seam at shallow depths (12 to 23 feet deep). For the most part the coal seemed to be intact. Several disturbed areas were found where mined waste material filled in small strip pits. Small partially filled shafts and pits were noted in areas away from the proposed roadway embankment. Only two voids were found initially on the right-of-way and they were adjacent to a strip mine area.

Approximately 2 years ago, a local phone company dug a deep trench to bury cable along a side road in the proposed right-of-way. The trench was dug approximately 8 feet deep. As they were digging they broke into a 3 x 4 foot shaft. This alarmed us since we had drilled several holes on this side road without encountering a void. We brought in our auger rig and drilled holes on a 50 foot pattern. Several more voids were found over a 600 foot section under the proposed roadway and an exploratory drilling and grouting phase was added to the project before construction began.

The exploratory drilling and grouting phase took place after the right-of-way was cleared of trees. A considerable amount of drilling proved necessary to locate several mine shafts that extended over a larger area than previously estimated.

The right-of-way area that KDOT purchased for this project is wide enough for a 4-lane road. Only a 2-lane roadway is being constructed at this time. Denver Grouting was contracted to drill exploratory holes on a 20 foot pattern to investigate 4 areas under the proposed pavement of the 2-lane road. Denver Grouting drilled 367 holes of which 53% contained voids requiring 912 cu meters of concrete fill. We only required grout under the 2-lane roadway embankment to

keep our costs down as much as possible. The areas under the additional 2-lanes will be investigated later when that alignment is designed in the future.

The small strip pits delineated by geology during the initial investigation were larger and more extensive than previously thought. Numerous mine shafts were found along the walls of the buried strip pits. Acid mine water seeped out from some of these shafts into our excavations. Geology was called in to help design a drain to take the mine water away from the roadway embankment and limestone aggregate served as a way to help neutralize the acid mine water as it drained toward the nearby creek.

After completion of the "drilling and grouting phase" of the project and after the strip pits were backfilled and compacted, the contractor completed the excavation of the left ditch along a 500 foot "grouted" section. To achieve the designed grade of the ditch in this section, the contractor had to completely excavate the massive bedded Blackjack Creek Limestone Member. While watching this work being done we realized there was more work to be done. Cutting the ditch to design grade removed most of the protective limestone cap rock that covered the shafts in this section. It was necessary to bring in equipment to excavate the shale bedrock remaining to expose the shafts located there. Approximately 3 feet of shale bedrock was removed to expose and backfill five shafts found in the ditch between the embankment and the backslope.

Any time a new project is proposed in Southeast Kansas we must be wary of the fact that although no mine maps are available and very little evidence exists for mining at the surface, there may be voids in shallow coal beds throughout the area.